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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,502	01/10/2002	Axel Scherer	Q135	9281

7590 01/13/2003

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EXAMINER

VY, HUNG T

ART UNIT PAPER NUMBER

2828

DATE MAILED: 01/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/044,502

Applicant(s)

SCHERER, AXEL

Examiner

Hung T Vy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other:

DETAILED ACTION

1. In response to the communications dated 01/10/2002, claims 1-20 are pending in this application.

Acknowledges

2. Receipt is acknowledged of the following items from the Applicant.
Information Disclosure Statement (IDS) filed on 07/30/2002 and made of record as Paper No. 4.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1-20 rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the phrase “nanocavity array”, “ photonic crystal”, “lithographically formed”, and “predetermined spectral response” render the claim indefinite because it is unclear what is “nanocavity” means. The claim does not recite laser structure, how can the claim define nanocavity. It is not clear how to lithographically formed and predetermined spectral response of each nanocavity.

Regarding claim 5, the phrase “a laser array” renders the claim indefinite because it is unclear what is “a laser array”. The claim fails to recite the structure of a laser array.

Regarding claim 6, the phrase “a detector array” renders the claim indefinite because it is unclear what is “a detector array”. The claim fails to recite the structure of a detector array.

Regarding claim 7, the phrase “array is an all optical gate” renders the claim indefinite because it is unclear what is “array is an all optical gate”. The claim fails to recite the structure of optical gate.

Regarding claims 8 and 9, the phrase “all optical router”, and “modulator” render the claim indefinite because it is unclear what are “all optical router”, and “modulator”. The claim fails to recite the structure of optical router and modulator.

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Regarding claim 10, the phrase “photonic crystal is formed in active quantum well material” renders the claim indefinite because it is unclear how to form in active quantum well material.

Regarding claim 11, the phrase “vertical cavity surface emitting lasers, VCSELS” renders the claim indefinite because it is unclear what is “vertical cavity surface emitting lasers, VCSELS”. The claim fails to recite the structure of vertical cavity surface emitting lasers.

Regarding claim 12, the phrase “a cubic half-wavelength” renders the claim indefinite because it is unclear what is “a cubic half-wavelength”. The claim fails to recite size structure to define a cubic half-wavelength.

Regarding claim 13, the phrase “array of lasers”, nanocavity laser” and “ pump for an adjacent nanocavity laser” render the claim indefinite because it is unclear what are “array of lasers”, nanocavity laser” and “ pump for an adjacent nanocavity laser”. The claim fails to recite structure of laser.

Regarding claim 14, the phrase “a nonlinear optical material filling said photonic crystal” renders the claim indefinite because it is unclear what is “a nonlinear optical material filling said photonic crystal”.

Regarding claim 15, the phrase “array is a tunable nanocavity laser, detector, router, gate or spectrometer array” renders the claim indefinite because it is unclear what is “array is a tunable nanocavity laser, detector, router, gate or spectrometer array”. The claim fails to recite the structure of tunable nanocavity laser, detector, router, gate or spectrometer array and the connection between those elements.

Regarding claim 16, the phrase "means for changing optical or electrical properties of said nonlinear optical material" renders the claim indefinite because it is unclear what is "nonlinear optical material" and unclear to define how to provide optical or electrical.

Regarding claim 17, the phrase "a cubic half-wavelength" renders the claim indefinite because it is unclear what is "a cubic half-wavelength". The claim fails to recite size structure to define a cubic half-wavelength.

Regarding claim 18, the phrase "photonic crystals", and "in Si-Ge materials on silicon substrates disposed on insulators" renders the claim indefinite because it is unclear what is "photonic crystal". The claim fails to recite structure of laser.

Claim 19 depends from rejected claim 1, 17 thereby render these dependent claims indefinite.

Regarding claim 20, the phrase "a waveguiding layer disposed adjacent " renders the claim indefinite because it is unclear what is "waveguiding layer". The claim recites no laser to define a waveguide.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 ,7-14, and 16-20 are rejected under 35 U. S. C. § 102 (b) as being anticipated by O. Painter et al., Science Vol. 284.

Regarding claims 1-5, 7-14, and 16-20, O. Painter et al. disclose a compact electrical and optically pumped multiwavelength nanocavity array comprising a plurality of nanocavities (See p 1819, column 3), each nanocavity defined in a photonic crystal (See p 1820, column 1) in which each nanocavity is lithographically formed to define a corresponding predetermined spectral response of each nanocavity, said plurality of nanocavities forming said array (See fig 1). Photonic crystal is formed in active quantum well material (See p 1820, column 2, first paragraph). Nanocavities are vertical cavity surface emitting lasers (see p 1919, column 3). The array of photonic crystals comprising a silicon slab waveguide (See p 1820, column 1, second paragraph)

Claim Rejections - 35 U.S.C. § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 15 rejected under 35 U.S.C. 103 (a) as being unpatentable over O. Painter et al., Science Vol. 284, in view of Tanguary, Jr. et al.

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Regarding claims 6, and 15, O. Painter et al. disclose all limitation of compact electrically and optically pumped multiwavelength nanocavity array but admission do not disclose the detector array. However, Tanguary, Jr, et al. disclose the dectector array (76a, 81a) (See fig 11)

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify O. Painter et al. to have detector array as taught by Tanguary, Jr, et al. because those skilled in the art will recognize that such modification and variations can be made without departing from the spirit of the invention.

Citation of Pertinent References

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Electronics Letters to W. D. Zhou et al. disclose Electrically Injected Single-Defect photonic bandbap Surface-Emitting Laser at room Temperature, Vol. 36.

The Optics Letters to S. Y. Lin et al. disclose Dirrect Measurement of the Quality Factor In Two-demensional Photonic-Crystal Mirocavity, Optical Society of America Vol.26, No. 23.

The patent to Joannopoulos et al. disclose Light Emitting Device Utilizing a Periodic Dielectric Stucture, U.S. Patent No. 5,955,749.

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The patent to Iafrate et al. disclose Multi-dimensional Quantum Well Device ,
U.S. Patent No. 5,503,447.


The patent to Joannopoulos et al. disclose Tunable Microcavity and Method of
Using Nonlinear Material in a Photonic Crystal.

Conclusion

8. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung VY whose telephone number is (703) 605-0759. The examiner can normally be reached on Monday-Friday 8:30 am - 5:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul IP can be reached on (703) 308-3098. The fax numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


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January 10, 2003